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SAFETY EFFICIENCY

MINERAL INDUSTRIES

BULLETIN

March 1995

INSIDE:

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Safety—FIRST

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Everyman's disease

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1994-1995

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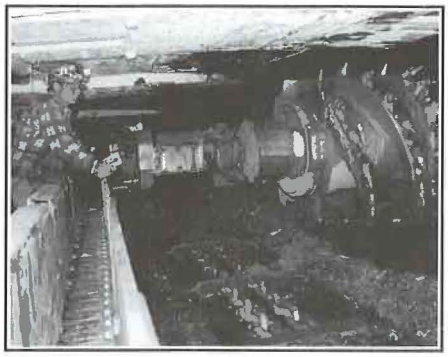
*We welcome **any** materials that you submit to the Holmes Safety Association **Bulletin**. We especially need color photographs (8" x 10" or larger—color negatives are acceptable) for our covers. We cannot guarantee that they will be published, but if they are, we will list the contributor(s).*

contents:



The Holmes Safety Association Bulletin contains safety articles on a variety of subjects: fatal accident abstracts, studies, posters, and other health and safety-related topics. This information is provided free of charge and is designed to assist in presentations to groups of mine and plant workers during on-the-job safety meetings.

PLEASE NOTE: The views and conclusions expressed in "HSA Bulletin" articles are those of the authors and should not be interpreted as representing official policy of the Mine Safety and Health Administration.

KEEP US IN CIRCULATION—PASS US ALONG

WELCOME NEW MEMBERS

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Clean Energy Mining Co.	11007	Sidney, KY
Solid Energy Mining	11008	Sidney, KY
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Samples Mine	11028	Charleston, WV
Mine No. 1	11029	Summersville, WV
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Navajo Rock Plant	11031	Templeton, CA
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Lacorte ECM, Inc.	11033	Troy, NY
Harlow Excavating & Contract	11034	Lake Placid, NY
Ray Manley Construction, Inc.	11035	Keene Valley, NY
Trudeau Sand & Gravel, Inc.	11036	Saranac Lake, NY
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D.B. Hill Contractors, Inc.	11038	Little Rock, AR
Moorpark Plant	11039	Azusa, CA
Azusa Plant	11040	Azusa, CA
Reliance Plant	11041	Irwindale, CA
Overton County Highway Dept.	11042	Livingston, TN
Copeland Materials, Inc.	11043	Cookeville, TN
Southern Crane & Elevator Inc.	11044	Piano, TX
Chelyan Prep. Plant	11045	Cabin Creek, WV
Lower Emma Mine	11046	French Gulch, CA
E.P. Bender Coal Co.	11047	Carrolltown, PA
Rice #2	11048	Friedens, PA
Weyrick Sand & Gravel	11049	Templeton, CA
Town Of Westport	11050	Westport, NY
Cliff's Electric	11051	Feura Bush, NY
Town of Crown Pt. Hwy. Dept.	11052	Crown Point, NY
Gilbert Western Corp.	11053	Camas, WA

Holmes Safety Association Monthly safety topic

Fatal powered haulage accident

GENERAL INFORMATION: A part-time loader operator, age 78, was fatally injured when his personal vehicle (a pickup truck) struck the edge of a stockpile at a high rate of speed and rolled over several times. The victim succumbed to his injuries nine days later while hospitalized. The victim had a total of 3 years 9 months mining experience, all of which was at this mine as a part-time loader operator.

The operation was a multiple bench limestone pit.

At the time of the accident there was no mining or milling equipment at the pit site. The only person working was the victim, who loaded aggregate from the stockpiles with a front-end loader and recorded the customer sales.

The Rock Crushing Plant #2 that processed the limestone into stockpiles was moved from this pit in 1993. A Caterpillar Model 950 frontend loader was the only remaining piece of equipment and was used to load customer trucks. The accident occurred at the site stockpile area which consisted of five separate piles of various grades of limestone aggregate.

DESCRIPTION OF ACCIDENT: The victim, a part-time loader operator, reported to the pit the morning of the accident, unlocked the gates, and started the loader, as was his normal practice. At about 9:40 AM, the customer who the victim had come to load, arrived. Seeing the victim sitting in his pickup and the loader idling, the customer drove to the lime pile where he backed in to the loadout area.

A short time later, the customer (the only witness) saw the victim's pickup traveling at a high rate of speed. Tire tracks at the scene indicate the pickup was accelerating rapidly (tires spinning) for some distance prior to striking the first crushed rock stockpile. One of the stockpiles momentarily blocked his view. He then saw the pickup airborne between the crushed rock and riprap piles as it traveled in his direction. The pickup struck the frozen pile edge, became airborne for about 36 feet, then struck the riprap stockpile. It again went airborne, striking the ground about 30 feet away from the riprap pile, then flipped end over end and sideways for about 33 feet, coming to rest on its wheels. He ran to the pickup and saw the victim laying on the ground next to the open pickup door. The customer immediately contacted 911 for assistance.

The victim was transported to the hospital by ambulance, then transferred to a trauma hospital, where surgery was performed to remove a blood clot on the brain, and to treat his severe head injuries. The victim never regained consciousness and died of his injuries nine days later. An autopsy was not performed.

According to the victim's wife, the victim had a stroke history and had been on medication (Coumadin), since his last stroke 12 years prior to this accident.

CONCLUSION: The direct cause of the uncharacteristic, erratic driving by the victim leading to the accident could not be determined. His vehicle could not be tested due to accident damage, but the accelerator and brakes appeared operable. An autopsy was not performed, therefore, it was not possible to determine if the victim's health may have been a contributing factor.

The vehicle involved in the accident was a Ford F-150 pickup owned by the victim. It was not possible to test drive the vehicle after the accident due to the extensive damage. The braking system appeared to be fully operational. The accelerator pedal appeared to operate normally but the engine could not be started to confirm it.

July 3, 1926; Pettebone Colliery No. 6 (Anthracite), Kingston, PA; 7 killed

On the morning of July 3, a squeeze along the robbing line of a pillar section caused the men to be withdrawn to another part of the section. When the fall came at about 9:00 pm, an accumulation of gas was forced into the area where the men were working, and the gas was ignited by matches, smoking, or a reflective flame safety lamp. Seven men were killed and 8 others injured.

Reprinted from Bureau of Mines Bulletin 586.

Experimental training to reduce variability in the interpretation and application of machine guarding requirements

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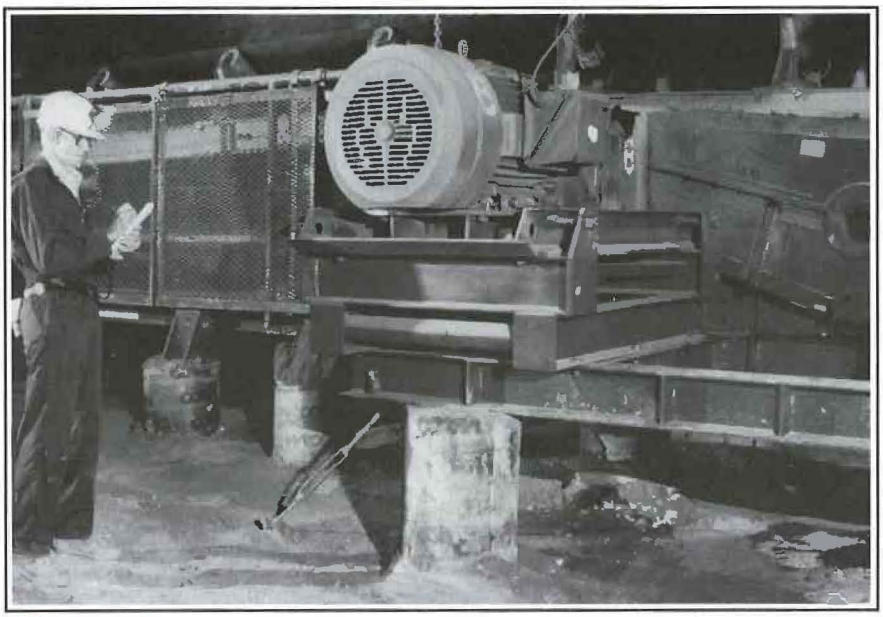


Abstract

The use of machine guards for industrial equipment is commonly accepted as a primary means of injury prevention. Often the interpretations of rules pertaining to machine guarding lead to a variety of guarding applications at the worksite. The consequences of this variability between regulatory intent and practice are evidenced by the frequency of guarding citations by inspectors, litigation seeking to ameliorate judgment of the inspectors, injuries that may be sustained because of workers' misunderstanding of safe guarding practices, misinterpretations of guarding requirements, or failure to comply with guarding mandates.

Training is a common method used for reducing this variability. This paper describes a U.S. Bureau of Mines-developed training intervention that might begin to define and identify this variability within the inspectorate, work force, or management. The fidelity of the training is enhanced through the use of three-dimensional slides and the structure of the classroom exercise. The classroom simulation moves beyond traditional safety training by offering an opportunity to apply general guarding rules and regulations to a specific situation. It is suggested that this type of training may be useful in defining and seeking solutions to the apparent variability in both the interpretation and application of guarding requirements.

Introduction

The reason behind a machine guard seems simple enough—to prevent employees from coming in contact with moving parts. The method of providing that protection appears equally simple—install a barrier. Machine guarding is not a new concept. The first patent issued for a machine guard was registered in 1868.[1] Since then, the guarding of moving parts has become much more sophisticated. A major influence on present machine guarding practices was the Occupational Safety and Health Act of 1970 (OSHAct).[2] Within a few years of the OSHAct, the National Safety Council asserted: "One of the major goals of the [Act] is the guarding of all machinery and equipment to eliminate personnel hazards created by point of operations, in-going nip points, rotating parts, flying chips and sparks. These hazards have been responsible for countless numbers of injuries, and fatalities of personnel. **If the now required guarding had been required back then** [prior to the OSHAct], many if not most of these accidents might have never occurred and even... **[the Act itself] would probably not be the law of the land.**"[3] These remarks imply a widely accepted recognition of the importance and application of machine guarding requirements.

What can be done today to better apply a proven technique for loss prevention? While the solution may be elusive, the U.S. Bureau of Mines (USBM) conducted this

research to learn more about the sources of variability between guarding theories, regulations, and everyday practice. This approach would involve the collection of data. These data could define the variability within the inspectorate, management, and work force concerning the practical understanding and application of guarding requirements. Defining variability, through structured training experiments, may lead to a shift in the way one thinks about traditional safety training. These "training experiments," in defining variability, may lead to innovations in guarding practices, work procedures, and training protocols. Benefits could include a further reduction in the number of injuries related to improper guarding practices, reduced levels of violations, and lesser reliance on the judicial system to resolve a variety of interpretations of machine guarding regulations.

Evidence of variability

Although the sensible notion of "good guarding practices" is fairly common within general industry, other factors suggest that variability exists in the regulatory interpretation and use of machine guards at the workplace. How can this variability be described? Does it fall within the literature relating to perception and recognition, motivation, judgment and decisionmaking, ergonomic design, or the adherence of workers to safe job procedures? Understanding and describing this variability may offer insight to solutions that embody all these concepts. This knowledge could assist in the design of training, the design of guarding components, or regulatory policy. The evidence of variability is manifested by the information ob-tained from injury reports, legal controversies, and violations-citations associated with machine guarding practices.

Injury data

One important consequence of variability between regulatory intent and practice is the frequency of serious injuries. A variety of questions might be posed based on any one of these incidents. To illustrate, in 1993, a beltman was fatally injured while cleaning an area around an underground belt drive. The U.S. Mine Safety and Health Administration (MSHA) investigative report[4] notes:

A beltman was fatally injured when he partially removed a guard from the side of a stationary roller and entered the take-up area with the belt in motion. Guarding for the belt and take-up assembly was constructed with four foot wide by eight foot long sheets of expanded metal welded in angle iron frames and bolted onto a main frame. The guarding was then secured to the entire length of the drive and take-up assembly on both sides. Evidence indicated that the victim partially removed the stationary guard in an attempt to gain access to the take-up area. While shoveling loose coal, he became caught in the roller and was fatally injured.

Assuming the guard was "adequate" prior to its removal, what are some questions that might be asked to explore the contributing factors?

1. Was there an appropriate machine guarding policy at the mine?
2. How was the employee trained? Were there any follow-up observations of his performance?
3. Was there a lockout-tagout procedure?
4. Was the hazard recognizable?
5. Was this a safe practice?

Responses to these questions highlight variability. These include perceptions of what constitutes (1) an *appropriate* policy, (2) *quality* training, (3) an *adequate* procedure, (4) a *recognizable* hazard, and (5) a *safe* practice. These perceptions would be expected to vary within and across the inspectorate, work force, and management.

Outside of mining, the importance of researching these questions is magnified. For example, within the agricultural sector, Etherton[5] estimates that 20,000 occupational amputations occur annually. Ninety percent of these serious injuries are traced to machinery and equipment.

The magnitude and severity of these injuries amplify the need to pose serious questions. The careful consideration of these questions might lead to a better understanding of the variability between regulatory intent and everyday practice.

Litigation

Another indication of variability is perhaps evident in the number of legal controversies surrounding safe or unsafe guarding practices. In more than a few cases, the final determination of "compliance" with guarding regulations is a product of the judicial system. In one case, involving a piece of mobile equipment, it was determined that failure to properly guard the cooling fan blades and air compressor belts and pulleys located on the front of the engine was a valid violation. The parts in question were located in the center of the engine compartment in front of the engine. In order for an individual to contact the parts, it would be necessary to reach over the truck frame, which is approximately 76.20 cm high, and extend one's arm a distance of approximately 76.20 to 91.44 cm. The judge ruled that "given the physical accessibility of the engine compartment, the fact that mechanics could check and work on running equipment, and that contact with the cited machine parts could occur, we conclude that a rea-sonable possibility of contact existed".[6] In litigation, variability is exhibited by the opposing views of those involved in the case.

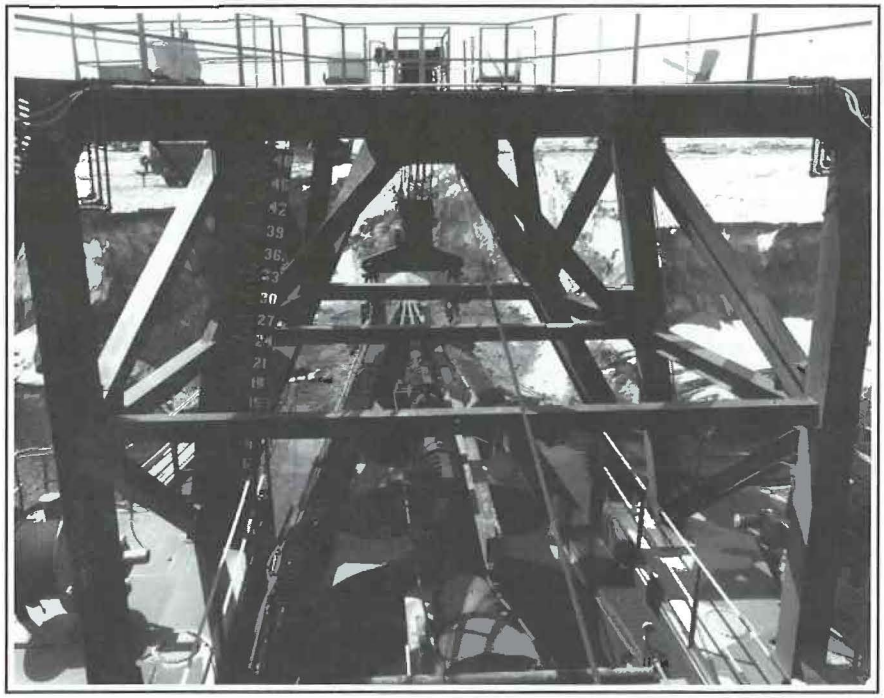
Violation and citation data

Violation and citation data may also imply large levels of variability within and across the inspectorate, general work force, and management. In 1991, for general industry, OSHA reported over 4,000 violations issued for unsafe machine guarding practices, with an initial dollar penalty of $6.64 million.[7] The direct costs resulting from citations of unsafe machine guarding ranked third, behind hazard communication and electrical lockout-tagout procedures.

A review of MSHA data indicated that from 1991 through 1993 there were 20,517 significant and substantial violations issued for unsafe guarding practices in the mining industry.[8] These numbers may be directly linked to the undefined variability that surrounds safe guarding practices.

How one interprets machine guarding regulations, how one determines if a guard is adequate (or, in compliance with the regulations), how one maintains or modifies a guard, or how one adheres to safe guarding practices can all contribute to large levels of variability.

For the regulators, the violation data explicitly imply variability in compliance profiles. Implicitly, is the issue one of adherence (motivation and skills)? Is it one of how workers and managers interpret the regulations? Or, a combination of both? Knowledge does not guarantee a decision to act, nor does it obligate the appropriate action. What can be learned from studies of traditional mine safety training that could offer insight to these questions?



Traditional methods for mine safety training

Safety training is a common method to inform and motivate workers to adhere to safety procedures and requirements. Its widespread acceptance to loss prevention is in-grained within regulations, company policies, and culture of the workplace. Training implies increased competence; competence suggests some means to measure; and measurement implies a connection between the training intervention and goals of the organization. Improved competence, in turn, cannot be defined without some means of evaluation. The concept of training (and performance) evaluation is consequential, as it suggests a means for improvement.

USBM-sponsored studies of mine safety training were described in a series of research reports by Adkins,[9] Digman,[10] Short,[11] and Cole[12] span-

ning the period of 1976 to 1986. These evaluative studies of mine safety training, coupled with the general safety training literature, offer insight into methods to understand the limitations of traditional safety training. Combined, these studies suggest a shift to instructional procedures that can better tie investments in training to the performance of the workforce. Performance measures imply a reliable means to evaluate, both within the context of the training and how those skills are transferred to the worksite.

Two of the more recent studies[10,12] observed a noticeable level of variability in both the conduct and outcomes of classroom health and safety training. This variability was observed during annual refresher training sessions. Researchers noted several of the reasons for this variability:

1. There was confusion among the trainers and participants concerning the expected outcomes of safety training.
2. There is limited availability of good test designs to assess health and safety knowledge and the application of that knowledge.
3. Miners were more attentive when participation was encouraged or instructors used stories or examples to ground the instruction.
4. The preponderance of concern was more apt to relate to quantity of instruction (i.e., hours of training) as opposed to outcomes (quality).
5. The use of innovative teaching techniques (games or simulations) was fairly common but usually limited to the factual recall of safety information.
6. Trainees appeared most attentive when discussions involved the resolution of a safety problem in a work procedure or emergency protocol.

These studies suggest that traditional mine safety training could benefit by more objective and reliable data. These data would better connect safety training interventions to the performance of the work force. It is within this context that the following training exercise was developed.

A new approach

The "Raggs and Curly" machine guarding exercise is a three-dimensional (3-D) latent image simulation.* The idea of combining 3-D slides with latent image simulation was first introduced in 1989.[13-14] The Raggs and Curly exercise embeds teaching with evaluation, makes use of 3-D slides to enhance the fidelity of the simulation, and is administered in small group settings. It is similar in structure and complements the growing set of interactive, latent-image, problem-solving simulations described elsewhere.[12,15]

Raggs and Curly is an eight-question, seven-slide exercise that deals with machine guarding hazards and unsafe practices. The Raggs and Curly exercise is set at a surface coal mine. The situation is as follows:

You, Earl E. Raggs, are the chief mechanic at the main mine complex of the AB Coal Company. You have been called to the Jake's Run surface mine. The mine supplies coal directly to rail

cars by means of a 48" mobile conveyor. The superintendent explains that during a recent insurance company inspection, some potentially dangerous situations concerning improper guarding practices were noticed. He instructs you to conduct a survey and document the guarding problems you observe around the mobile conveyor. Your recommendations will be part of a planned company wide guarding policy. He assigns Noah "Curly" Hair, who just recently became a mechanic's helper at this operation, to accompany you. The superintendent stresses the fact that Curly is not too familiar with safe guarding practices and asks that you take this opportunity to share your knowledge concerning guarding. You and Curly are to report back to the superintendent with your findings.

Skills developed through this classroom simulation include machine and equipment guarding strategies and procedures; hazard identification; and warning and caution sign usage; safe work habits; safe guarding practices; and decisions involved in the use of factual, regulatory information in their application to specific machinery and equipment.

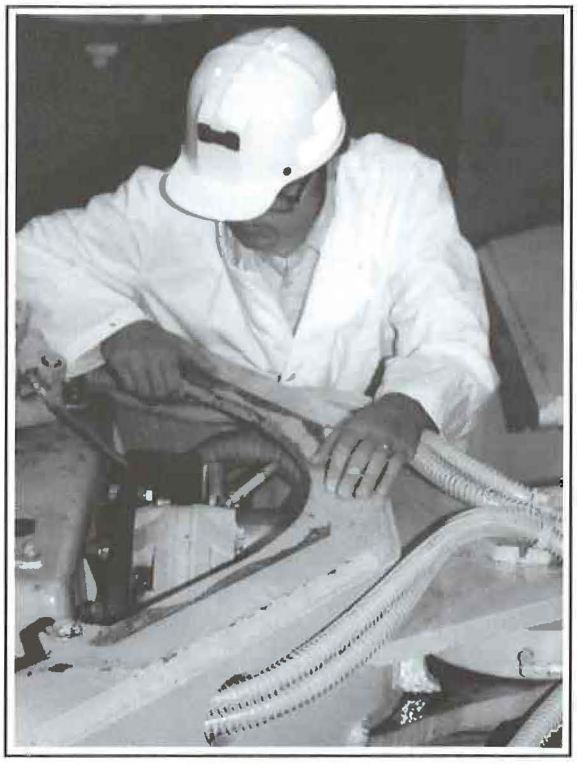
The exercise follows Raggs and Curly as they evaluate machine guards and discuss safe guarding practices. The efficiency of the training is noted through the opportunities to experience real-life situations and the application of factual knowledge often reserved for on-the-job learning. The classroom training and discussion provides a controlled setting for trainees to experience the consequences of both good and bad decisionmaking. The exercise itself is designed to reinforce good decisions and to correct errors when inappropriate decisions are made.

The exercise seeks to apply and reinforce important characteristics in guard design and construction. These characteristics of guard design are summarized in the widely distributed "MSHA Guide to Equipment Guarding for Metal and Nonmetal Mining".[16] As MSHA notes: "Such guards should:

1. Be considered a permanent part of the equipment or machine.
2. Afford maximum protection.
3. Prevent access to the danger zone.
4. Be convenient—they must not interfere with efficient operation.
5. Be designed for the specific machine, with provisions made for oiling, inspecting, adjusting, and repairing machine parts.
6. Be durable and constructed strongly enough to resist normal wear.
7. Not present a hazard in itself."

The guard might also be constructed to contain those parts that may fail or be propelled to possibly strike employees. As participants work through the exercise, they begin to discover the difficulties that can exist in the interpretation of regulations, the necessity for safe guarding practices, and common misperceptions about guarding requirements. It is within this context that this exercise approaches training.

The exercise is now being field tested and will be revised as needed. Once completed, the exercise will be sent to the National Mine Safety and Health Academy located in Beckley, WV, for distribution to those mining companies requesting machine guarding training exercises.



Summary and conclusions

Variability within the applied interpretations of rules, regulations, and actual work practices may be a major contributing factor in machine guarding injuries, violations, and litigation. The experimental training simulation discussed in this paper is an attempt to better define and understand differences in the interpretation and application of machine guarding regulations. The use of the 3-D slides within a realistic problem setting can improve the fidelity of safety training, thus aiding in the transfer of safety skills. The benefits of this and similar exercises could be a further reduction in the number of injuries related to improper guarding practices, less reliance on the judicial system to resolve a variety of interpretations of machine guarding regulations, and a reduced level of violations.

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Breaking the "Safety Talk" cycle

by David Dehaas,
ONRSA Senior Education Specialist

Why do so many accident investigations—conducted by hard-working, well-trained people who have all the time, all the tools, and all the organizational commitment they need behind them—still fizzle out at the end with no more than another safety talk as the only real recommendation? The answer may be "mindset." It may be that we set out with a basic assumption that leads us astray. That assumption, that mindset, is captured in the opening line that we hear investigator after investigator use at the start of the process: "We're trying to find out what went wrong."

At first glance, that seems like a reasonable goal for an accident investigation. *But the statement may actually reseal an underlying view of accident causation that will make it hard for the investigation to discover the real causes; and it may suggest a mindset that will make useful changes unlikely.* Finding out "what went wrong" will focus the task on identifying the conditions and the actions that were unique to the moment of the accident. What we should be doing is examining the system that lets those causal factors exist in the first place.

If we set out on the investigation to "find out what went wrong," then we are assuming that everything was "going right" until just before the accident. At that point, we assume, the conditions surrounding the situation and the actions of people involved started "going wrong" and an accident happened. After that, things went back to normal and were "going right" again.

For most accidents, however, that view does not correspond to reality. Things were *not* "going right" before they started "going wrong." All the causes of the accident were there all along, hidden like dormant viruses within the system. The design of machines, equipment, production lines and processes that was in place for the accident, was in place before the accident and is most likely still in place now. The procedures being followed at the time of the accident were ones that people had been using before the accident and continue to use after it. The unusual occurrences or deviations from standard procedure that seemed to trigger the accident had probably happened many times in the past and can be expected to continue to happen at a similar rate in the future. *The causal factors exist on a continuous basis; only their timing and combination were unique to the moment*

of the accident.

At first glance, many people may disagree with this view: it may seem that the accident was caused by substandard acts and substandard conditions that arose or took place just before the accident. Furthermore, it may seem that the design of equipment, processes and procedures is not really an issue—because of the easily demonstrable fact that when the conditions and actions are "standard", the work proceeds safely; that it is, in fact, "going right" as long as the conditions and acts are kept to the straight and narrow "standard" of "proper procedure."

All of that would be true if there were such a thing as a pure proper procedure. But the fact is that while some procedures are better than others, there is just no such thing as an entirely, perfectly, 100% defect-free proper procedure.

Mathematical probability

Every "proper" procedure contains the whole range of all possible improper procedures as an inseparable part of its genetic code. Adopt the proper procedure and you adopt all of the improper procedures along with it—*because they are essentially inseparable.*

If the task consists, for example, of taking widgets from a conveyor belt and placing them into a bin, then the proper procedure might state, "Pick up widget securely and place carefully in bin." We might conclude, therefore, that if we followed the procedure each time, no widget would ever be dropped. And if there were such a thing as a 100% proper procedure, then it would be so. But the proper procedure is not "pure" because it is not a fixed value or a statement of absolutes—it actually defines a *range of specifications* that lie within certain parameters. "Pick up widget securely" refers to grasping the widget with a certain amount of force. But what amount? The specification for force describes a range that extends above and below an ideal "standard". Given a range of possibilities and an open-ended series of "shots at the target", we can predict where the shots will fall: most around the middle of the range, some at one end, some at the other— *and a few outside.*

It is tempting for us to define the procedure as consisting of that "standard" fixed amount of force. But if we take that "standard" and apply it to human performance of a task repeated thousands and millions of times by different people under different circumstances, then there are going to be variations and deviations.

If we stand back from the specification and say "That is what the proper procedure looks like," then we will have made the most elementary mistake in statistics and probability. That is *not* what the procedure looks like. That is what *one application* of the procedure *might* look like! That one application was measured under ideal conditions, with the operator concentrating and doing his best. What the procedure itself actually looks like—day in, day out, eight hours per day, with a variety of operators under a variety of conditions—is the sum of all the possible variations in its application. (*Not* the average; the *sum*—we get all of them, the average ones, the high ones, the low ones, the good ones the bad ones, *all* of them.)

In other words, if we build into the process design a procedure that includes possible ways to drop a widget (i.e., too much or too little force when grasping), *then we will drop widgets.* (And, yes: everything we said about contamination of proper procedure applies, in principle, just as well to "conditions." If any given condition is possible in theory, it will turn up in nature sooner or later—and in accident investigation recommendations sometime soon thereafter.)

Appalling certainty

One of the truly appalling realities when it comes to contamination of a "proper procedure" with the lurking possibility of an improper application, is that repetition multiplies the contamination until it surfaces as a certainty. The degree of "contamination" may appear to be minuscule; but consider the implications of a million-to-one possibility built into a procedure for a repetitive task. One widget coming down the line every 10 seconds, at 7.5 hours of 55 minutes each, over a 240-day work year means that the odds of dropping a widget reach one-to-one in just 1.68 years. Not a bad record if widgets are harmless. Pretty frightening if widgets explode when dropped.

The designers of the process, seeing the million-to-one odds against dropping an exploding widget, may have assumed that their 99.9999% pure procedure was as near perfection as humanly possible; but the contamination of a "proper procedure" with a fatal possibility *in any concentration* will eventually lead to a fatal accident.

This brings us back to the accident investigation and the central question about the usefulness of investigations: will our investigation end with changes to the system that remove the fatal possibility from the formula? *Or will we merely reconfirm the "proper procedure" that contained the original virus of an inevitable improper application?*

If we set out from the start to "find out what went wrong", then we will eventually arrive at that substandard act or improper application of the procedure that resulted in the dropped widget. When we see it, we will immediately identify it as being outside of our definition of "proper procedure" and we will zero in on it as the "cause" of the accident; and, having done that, we will have little choice but to attempt to remedy the situation in those same terms of "proper" and "improper"

procedure. (Translation? Give the operators a safety talk on proper widget picking procedure.)

If we look at the recommendations that we find at the end of most accident investigation reports, we will see that this is so. For every recommendation that deals with process design, there are a dozen that deal with procedure; and for every one that recommends making changes to the procedure, there are three that urge more intense application of the existing "proper" procedure—more training, more safety awareness, more crew motivation, more supervision, more enforcement. But, as we have seen, if we concentrate our efforts on applying a proper procedure, then we may also unwittingly be applying the small but certain proportion of possible *improper* procedures that accompanies it.

A better starting point

So? How do we break out of the "proper procedure" trap and escape the "safety talk" dead end? How do we make *meaningful* change to prevent a recurrence? Let's start back at the beginning. Instead of setting out to "find out what went wrong," let's take a full step back and say, "Let's try to find out what is wrong with the system." This statement is based on the following logic: we have a certain system; we just had an accident within that system; therefore, accidents are possible within our system; therefore, there is something wrong with our system; therefore, we have to fix the system.

If we focus our attention on what *is* wrong with the system (as opposed to what *was* wrong with its application) then we are placing the problem in the present and the solution in the future (as opposed to placing the whole incident in the past). The accident investigation then becomes an urgent and proactive task that will be expected to make changes to the system (rather than a fairly meaningless historical undertaking that results in yet another recommendation for a safety talk).

We must begin by accepting that the accident represents absolute proof of the existence of a hazard. Once we look at it in those terms, we can deal with it; and dealing with an identified hazard in a system is not a mysterious process. The System Safety order of precedence for dealing with hazards gives us a clear list of choices.

☐ We can design to eliminate the hazard. Remember that we predicted that *every possible* outcome would occur sooner or later. So we could identify all of the undesirable possible outcomes and redesign the process to eliminate them. This could be system design to eliminate the conveyor, the bin, the need to lift widgets, the possibility of dropping them, or even their explosiveness.

☐ We can design to minimize the energy involved. Perhaps instead of having one big widget that produces a big explosion when dropped, we could do the job with a number of small widgets that produce no more than a loud bang when dropped.

☐ We can provide a barrier and/or safety device. Perhaps our widget pickers should be sitting behind an explosion proof plastic window picking widgets with a remote control arm.

☐ We can design to minimize the potential for making mistakes. It could be redesigning the widget picking station to add padded deflectors, to move the opening of the bin closer, to make the opening bigger, to put the operator closer to it. It could mean giving pickers a widget holding tool.

☐ And yes, we can design a "proper procedure." Then, of course, we have to train, educate, and supervise the widget pickers.

Finally, we can stand back from our redesign and do a top-to-bottom reassessment to see how effective our changes really are—and to assess how much hazard is still left.

All of these control techniques can be focused on the accident that highlighted the existence of its causal hazard; as such, they can be taken as the list of options for recommendations to address the hazard. Knowing that these are the available remedies, we can investigate in terms of *system*, in terms of *hazard* and in terms of *changes* that will be made to the system, to the equipment and to the process. Our investigation will not be focused on examining the accident that happened in the *past;* it will be centered on discovering and dealing with the hazard we now know exists in our system in the *present.*

In the final analysis, it's a matter of mindset and of perception. *We tend to find what we go looking for, and we tend to stop looking when we have found the thing we expected to find.* If we go into an accident investigation believing that the accident was a unique and isolated event that occurred in the past and has little relevance in the present, then that is what our investigation will find. If we start out with the assumption that our system contains a hidden flaw that gave rise to the circumstances of the accident, then *that* is what we will find. In the "what-went-wrong" approach we will gather details, facts, times, dates, and names; in the "what-is-wrong-with-the-system" approach we will pinpoint the key elements of the blueprint for systemic change. And then there will be no more exploding widgets! Or at least none will explode from being dropped. Hmmm. Maybe we'd better do a thorough System Safety Analysis of the whole widget production process. But that's a topic for another day.

Reprinted from Ontario [Canada's] Natural Resources Safety Association's November/ December 1994 issue of ***Health & Safety RESOURCE.***


KNOW
YOUR
BLAST
AREA!
Beware of flyrock

Holmes Safety Association Monthly safety topic

Fatal explosives accident

GENERAL INFORMATION: A 34 year old driller/hole loader, with 6 years of mining experience, 5 months at this classification, was killed when he was struck on the head by a piece of flyrock during the blasting of the rock parting in the coal seam being mined.

The operation is a surface mine working in the Mansfield coal seam, which is 60 inches in height with approximately 12 feet of parting material in the middle of the seam. The prime contractor had contracted the blasting operations to another firm.

DESCRIPTION OF ACCIDENT: The blasting crew came to the Owen Pit to drill and blast the parting. The driller had begun to drill six holes before the rest of the crew arrived on site. About 7:30 AM, the blaster, and the victim, a driller/hole loader, arrived in the pit to help the driller. At this time the blaster informed the men that a storm was coming into the area and because of lightning danger, they should discontinue their drilling until the storm passed. The blaster informed the mine superintendent that they were going to wait until the storm passed. At this time, six holes with a diameter of 6.75 inches had been drilled to a depth of 11 feet and spaced 11 feet apart.

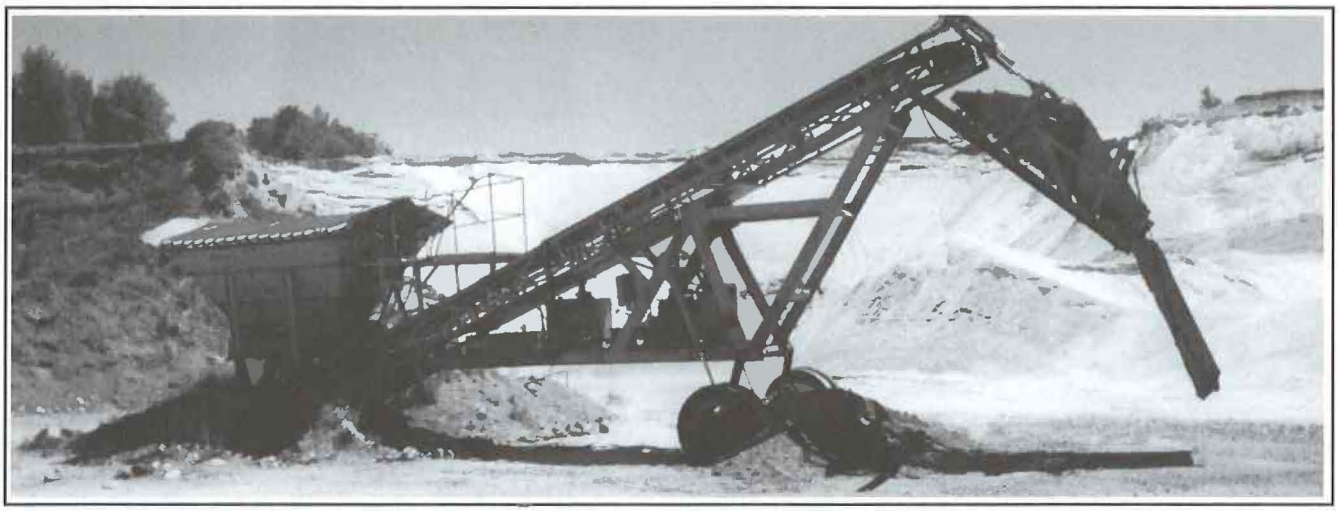
A total of 117 holes with a diameter of 6.75 inches were drilled on 11-foot centers. There were nine rows of 13 holes per row drilled to an average depth of 11 feet. The majority of the holes contained one foot of backfill, 1.5- to 2-feet of explosives, and 7.5- to 8-feet of stemming material, depending on the amount of water in each hole. Of the 117 holes drilled, 15 holes had water about one foot above the collar, and 31 of the holes had from 6 inches to 4 feet of water in them. The 15 holes with water above the collars only had 1.5-feet of the explosive mixture in them.

At 10:30 AM, they returned to the pit, continued the drilling, and started loading the holes. The hole preparation was completed about 6:45 PM. with a total of 117 holes being drilled. The victim moved the drill out of the pit while the blaster drove the explosives truck out of the pit, used it to block the pit access road and made sure that all persons were clear of the blasting area. The mine superintendent informed the blaster that all persons were clear and to give the signal that blasting was to proceed. The signal to blast was given at 7:12 PM. The driller, working under the direction of the certified blaster, set off the blast. The driller and the victim were located about 236 feet away from the blast area. Immediately after detonation, the driller and the victim saw flyrock coming toward them from the blast area. The driller and the victim turned and ran to a pickup truck, which was located about 10 feet away, to seek cover. The driller heard the flyrock hit the pickup truck and the surrounding area. Soft shale was lightly scattered around the accident site and near the victim's location. Shale had penetrated the fiberglass camper top on the pickup truck located near the victim's location. The driller saw the victim lying face down on the ground beside the pickup truck with blood coming out of his nose and ear. The victim's hardhat was damaged by the shale flyrock. The driller called out to the victim, but got no response. Unable to alert others by using the pickup truck's radio, the driller ran to the location where the blaster and the dozer operator, were to summon medical help for the victim. The blaster and the dozer operator had observed the flyrock being propelled by the blast toward the driller and the victim. When the blaster and the dozer operator, who both had EMT training, arrived at the accident scene, they also could not get any response from the victim. The ambulance crew arrived at 7:29 PM, and checked the victim for vital signs. No vital signs were evident. At 7:37 PM. the victim was transported to the county hospital and pronounced dead at 8:05 PM.

CONCLUSION: The accident occurred when flyrock, coming out of the Owen Pit, struck the victim, causing fatal injuries. The following factors are believed to have contributed to the accident:

1. The water in the holes was not given adequate consideration when being shot, and
2. The blasters were not removed a safe distance away from the pit or located in a suitable shelter.

Witnesses stated that on previous occasions, flyrock had been observed coming out of the pit during blasting operations. This was due to the holes being bridged with loose material and/or water.



Safety—FIRST

by Mickey Cronin

Our local MSHA inspector called up the other day, and asked if I would be interested in writing an article on what we do for safety here, where I work.

Here, is a small excavating contractor in the Northeast. We employ 7 to 20 people depending on the season. "Real" men work here. The kind that don't get hurt. "Oh, it's just a scratch, it'll heal" type men that don't have time for all that safety "crap." They have *real work* to do. That used to be the attitude. Some guys haven't changed their thinking much, but management *has*.

Training takes time, and costs money. Yes, no getting away from that. But it is also REQUIRED. Some of this training is just plain expensive, but the majority of it is not.

Our people are Hazmat Certified. This is probably the most expensive training, at $100.00 a person for our yearly refresher. There is the Hazard Communication Program that cost a great deal in terms of time and dollars. But most of the training comes much more often at little or nothing in terms of cost. This is how we try to keep safety out in the work place: Our foremen are supposed to give "Tailgate" safety meetings once a week on their job site. Since everyone has to know what is "on" for the day, a safety meeting can be slipped in without taking away from productive time.

We have an MSHA-trained instructor who doubles as a mechanic. When it is time to get the plant started up for the season, he can give instruction on all parts of the plant and the pit because he is there, where he can show as well as explain.

Every paycheck comes with a payroll stuffer that deals with some safety topic. Most insurance companies will gladly send you copies of safety pamphlets that they have available. We also use photocopies of fatalgrams from MSHA, and articles from the Holmes Safety Association "Bulletin." There are people in the community where you work that will also be glad to come and speak to your people on different subjects. We've had paramedics from the town ambulance speak at one of our meetings. Most of these people donate their time.

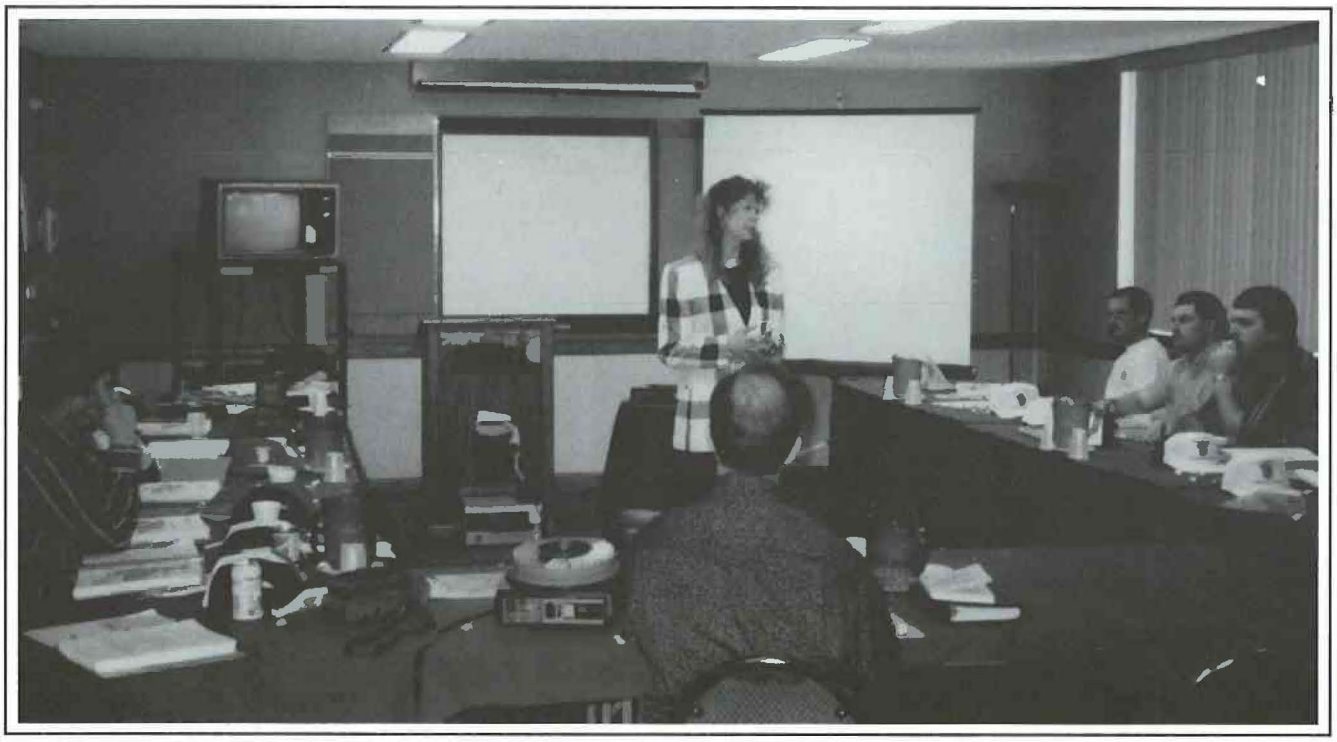
Your local Holmes Safety Association can help in supplying information and training. Our local chapter (the Berkshire District Council, Berkshire County, MA) puts on a seminar in March that provides 5-6 hours of MSHA-approved training. We have a speaker at most of our meetings—local people that tackle a specific safety topic, like electricity, blasting, etc.

It is hard to get people interested in safety, until an accident happens. But safety needs to come ***first***, not last. [Before there is an accident—so there will be NO accident.]

When one of our guys did a backwards somersault with a 15-ton roller, it would have been too late for MSHA standards on roll over protection. All the talk in the world about seat belts wouldn't have done him any good if he didn't wear it. It was probably both that enabled him to fire up the dozer, upright it, and walk away. This guy now thinks of safety first. But we don't want to have each of the men roll a piece of equipment to learn about safety.

We want our guys to think of safety—FIRST!

I guess what I'm trying to say is that to change their thinking, we had to change our thinking. Change starts at the top. It won't filter down if it doesn't begin there.



ECONEX stresses safety...

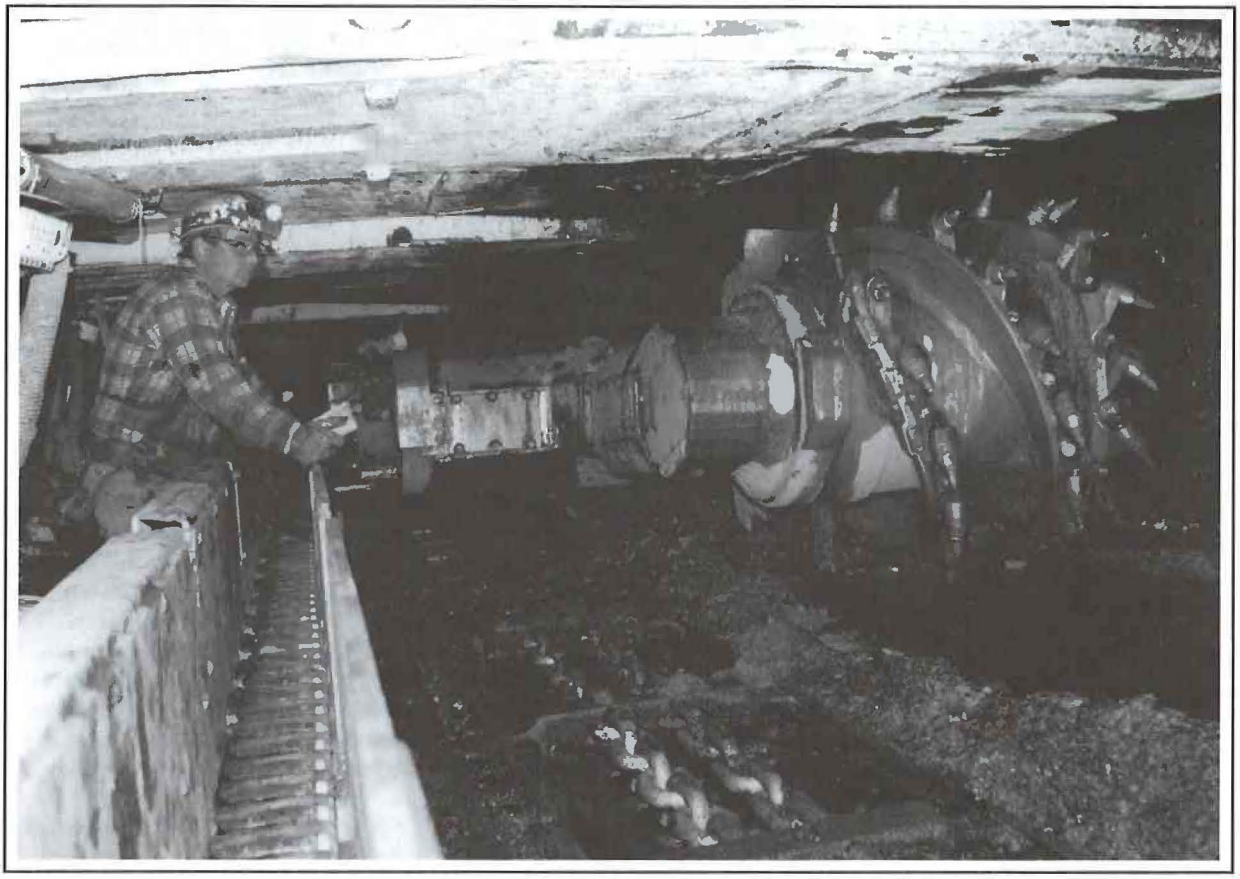
Our name is ECONEX North Incorporated, we are an independent contractor, servicing the mining and geophysical industry in all of Michigan and northern Indiana as a full line explosive distributor. With our many sites, we not only fall under MSHA, but also OSHA, EPA, Alcohol, Tobacco and Firearms and the Department of Transportation. Each one of the agencies require extensive hours of training ranging from "Health and Safety" to "Drug and Alcohol Awareness" to "Emergency Response" to "Magazine Storage" to "Hazardous Materials" and so on...

Before a new employee is even allowed to work on a mine site or drive a vehicle, the employee must have received a great majority of the training and have passed several tests. The training is done by our Safety Director.

One of our current safety programs that is proving to be successful is our "Safe Driver Awards." A report of any accident must be reported, regardless of the severity. For the safety and welfare of the driver, public, and company there must be a dedication to accident prevention.

Through the company Accident Review Board, which is made up of a driver, supervisor, and company president, accidents are determined to be either preventable or non-preventable. The preventable accidents are grouped: severe, major, or minor. Non-preventable is defined as the driver acting within company policy and not being at fault. Awards are given for each year of service without a preventable accident. Disciplinary action is determined for preventable accidents. The goals of our Accident Review Board are to: promote safety, study and determine the cause of accidents, take preventive measures, determine proper corrective action and provide safe driving incentives

In addition to the monthly safety topics, in January and February of each year the employees and supervisors all meet in a centrally located place where training is provided for two to three consecutive days. All employees are tested at this time to make sure each subject presented is understood. Guest speakers and presenters are brought in from throughout the United States to instruct on the various topics. Safety Awards are given to employees end a commitment to safety and regulatory compliance is reinforced. We pride ourselves on our customer dedication, professional people, and attention given to safety end regulatory compliance. ECONEX North Incorporated is very active in both the District Council and the National Holmes Safety Association.



Gary Hooper, a longwall machine operator, at Southern Ohio Coal Company's Meigs Mine No. 2 longwall (Sept. 1993).

Southern Ohio coal longwall panels among the largest in the world

Wilkesville, Ohio—Southern Ohio Coal Company's (SOCCo) Meigs Division, recently began operating its second longwall panel on a face more than 1,000 feet wide.

Employees at the Meigs No. 31 mine currently are mining the first panel in the B Block. The panel measures 1,080 feet wide and 9,160 feet long. Other B Block panels are approximately 1,100 feet wide, making them among the largest in the world. In addition, employees at the Meigs No. 2 mine are mining coal from a longwall panel measuring 1,050 feet wide.

"These represent the beginning of the largest longwall panels we have ever mined," said Hugh H. Lucas, vice president-mining operations for the American Electric Power (AEP) Service Corporation Fuel Supply Department. SOCCo is a subsidiary of Ohio Power, which is owned by AEP.

Lucas said 43 additional roof support shields were added to the Meigs No. 31 longwall panel when it began operating in October. He added that the move to B Block also required installation of a 13.2 kv power distribution system which was needed for the increased horsepower on the larger longwall panel.

"In the fourth quarter of this year we will be in the best position to produce coal at the Meigs Division since the second quarter of 1993," added Jim Tompkins, SOCCo vice president and general manager. The Meigs No. 31 mine began operating at the end of February this year after being idled since July 1993 when water from an adjacent, sealed mine entered the operation. During 1993, SOCCo's Meigs Division produced 3.7 million clean tons of coal for shipment to Ohio Power Company's Gavin Plant at Cheshire, Ohio. This year, the division will produce approximately 4.3 million clean tons.

Reprinted from the January 1995 edition of ***Acquire's Coal Today.***

JAHSA Medal of Honor Award salutes heroes of health and safety

June 6, 1994, marked the fiftieth anniversary of the first and "longest day" of the Allied invasion of Normandy. Various media noted this milestone with a plethora of articles and programs that told stories of D-Day heroism.

While mining is not really the same thing as fighting a war, people who respond to mine emergencies have much in common with war heroes. GIs—and miners—receive a lot of training in how to do their jobs. A big part of this training prepares members of each group to respond to stressful events. The acts we consider heroic often involve creative applications of newly learned skills when a GI—or a miner—faces unpredictable circumstances.

When a mining operation achieves safe production, and the days without a serious injury accumulate into months and years, the workplace becomes anything but warlike: it becomes very peaceful. But settling into routine patterns can be a set-up for complacency. As soon as we let our guards down and lose our focus, we become susceptible to accidents.

Familiarity with hazards—and how to protect ourselves from them—does not make them go away. So, just as our military branches maintain our country's defense, we as mining people need to be prepared to deal with accidents, even as we do everything in our power to prevent them.

Emergency preparedness is achieved through planning, training, drills, and simulations. When emergencies occur, we need to act fast, do the right things in the right order, and do those things the right way. We need to prepare for the worst before it happens, so that when lives are at stake, we won't need to waste time deciding what to do. We'll do it automatically.

At the National Holmes Safety Association Annual Awards Banquet in Lexington, Kentucky, on June 9, 1994, we honored four miners who, when faced with unexpected emergencies, acted correctly and in time to rescue fellow workers from danger.

The Joseph A. Holmes Safety Association presents a Medal of Honor for distinguished service in the saving of a life only when the rescuer's life is also put at risk. The medal is not given as a reward for reckless behavior, but as a solemn acknowledgment of a courageous act taken at a time when the only choices available are to risk your life by helping, or to run away from danger.

But the best way to explain what a Medal of Honor represents is to tell what each honoree did to earn one. Here are their stories:

On July 11, 1993, Jerry Stuart, a mechanic and EMT, drove an underground ambulance to an accident scene at Costain Coal Company, Baker Mine, Union County, Kentucky. Linvelle Webster, a coworker, had been pulled down into a coal hopper when an obstruction broke loose. Stuart joined the rescue effort, entering the coal chute from the bottom. Seeing that Webster was hung up by his miner's belt, Stuart cut the belt and pulled Webster free. Stuart initiated mouth-to-mouth breathing and then slid Webster down the chute. When the victim was clear, CPR was started. Webster soon began breathing on his own and then was transported from the mine.

Usibelli Coal Mine is located on the other side of the continent, in Healy, Alaska. In the early morning hours of November 30, 1993, Cary Rhoades was operating a tracked backhoe above a small, deep pond that was full of ice and water. After digging a short time, the backhoe slid into the sump pond. Miners Tony Mattielli and Jeff Cizmowski went out onto the ice and water to get Rhoades out. A large chunk on the top of the cab prevented the hatch from opening and only a corner was pried up. Mattielli and Cizmowski jumped over the side and smashed out the submerged window to get Rhoades out of the cab.

At the Sunshine Silver Mine in Kellogg, Idaho, on June 3, 1993, William A. Crouch, Shift Boss, was assisting electrician Steve Gravelle in the installation of a pump at the 4000' level of No. 5 shaft.

After the pump was installed, it would not operate. As Gravelle checked the pump circuit, he received a severe electrical shock that rendered him unconscious in about 32 inches of water. As he attempted to rescue Gravelle, Crouch was shocked three times himself. At one point, Crouch observed "blue sparks" going up his arm as he reached underwater for Mr. Gravelle.

Despite the desperate situation, Crouch remained calm enough to obtain a pair of insulated pliers from Gravelle's tool pouch, which he used to throw off the switch on the magnetic starter for the pump. After retrieving Gravelle from underwater, and realizing he was not breathing, Crouch began an improvised method of CPR on him, performing chest compressions with one hand while pulling him backwards about 200 feet to an old air door where Gravelle could be laid down.

After reviving Gravelle, Crouch went to a nearby stope to get help.

Gravelle was then transported to the surface and on to the hospital.

Thanks to the courage, determination, and training of William Crouch, Steve Gravelle's life was saved. In fact, Gravelle recovered fully, returning to work on June 8, 1993—only five days after the accident!

Jerry Stuart, Tony Mattielli, Jeff Cizmowski, and William Crouch have proven themselves to be true heroes of health and safety. While we all want our mines to remain peaceful and free of the need for heroic rescues, we know that serious accidents are always possible. And so we will continue to honor, and be grateful for, our heroes.

Awards will next be presented at the National Holmes Safety Association Annual Awards Banquet in St. Paul, Minnesota, on June 29, 1995. Information about the Medal of Honor and other awards available can be found on the inside back cover of this issue of the ***Bulletin***. If you know of an action deserving recognition, send in your nomination today.

David T. Couillard, Mine Safety and Health Specialist, Duluth, MN

Are you a criminal?

[Although the following story refers to Canadian statistics it EASILY applies to this side of the border!!!—Ed.]

Most of us don't think of ourselves as criminals. Yet in the last available Transport Canada survey, over half of those Canadians surveyed admitted to drinking and driving on occasion. Nearly one in five admitted to being impaired while driving. **Drinking and driving is the number one criminal offense in Canada.** In Ontario, it accounts for one in five admissions to correctional facilities!

Although the evidence indicates that the number of people who drink and drive is declining, there are still far too many of us who have not seriously considered the consequences. And those consequences are serious indeed.

Let's consider your chances of being killed or of killing someone else. Alcohol is involved in only 6% of car accidents, but accounts for over 27% of accidents resulting in fatalities. Of all drivers killed in car accidents, more than half had been drinking. All in all, if you are drinking and driving, you are **four times more likely to be killed.**

Even if no one is killed in the accident, the drinking driver has **no insurance.** That's right—you are 100% responsible for all damages, including loss of income. If you injure someone else, your insurance company is only responsible for the first $200,000 liability, no matter how much liability your policy says it covers. In short, you could be **financially ruined for the rest of your life.**

Actually, your finances may not be of great concern to you, unless you have a family to support. If your impaired driving caused someone else bodily harm, you may not need money because you could spend the next **ten years in jail.**

You say "No problem—I never drink and drive." Good! But you're not out of the woods yet. The next time you have friends or family over for some holiday cheer, remember—you could be fined $10,000 and spend up to one year in jail for serving an intoxicated or underage drinker. And if they injure themselves or someone else, you may be held legally liable for their actions. It may not seem fair, but it's the law.

It all boils down to two simple rules: Don't drink and drive—ever! Don't let your friends or family drink and drive—ever! **Drinking and driving can ruin your life—or end it.** Keep that sobering thought in mind every time you get behind the wheel of your car.

Reprinted from the November/December 1994 issue of Ontario [Canada's] Natural Resources Safety Association's ***Health & Safety Resource***

OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH
W	I	N	T	E	R

ALERT reminder: *● Always maintain adequate mine ventilation and make frequent checks for methane and proper airflow. ● Know your mine's ventilation plan and escapeways. Properly maintain methane detection devices. Communicate changing mine conditions to one another during each shift and to the oncoming shift. ● Control coal dust with frequent applications of rock dust. ● Make frequent visual and sound checks of mine roof during each shift. NEVER travel under unsupported roof.* *Courtesy of Va. Dept. of Mines, Minerals, & Energy*

Building a safety culture is theme of 1995 National HSA meeting

The Joseph A. Holmes Safety Association (JAHSA) and the Holmes Safety Association (HSA) will hold their annual meeting at the Radisson Hotel in St. Paul, Minnesota, on June 27–29, 1995. Topnotch speakers from a wide range of professions and organizations will address the challenge of building a safety culture.

Early arrivals to the meeting may register on Tuesday, June 27, beginning at 9:30 AM. From 1:00 PM to 4:00 PM, Paul Price will present an electrical safety workshop. Paul is an electrical engineer from MSHA's Denver Safety and Health Technology Center who is well known in the mining community for his ability to communicate complex concepts in common sense language. The executive committees of JAHSA and HSA will meet following the workshop.

Wednesday, June 28, begins with a welcome from James M. Salois, District Manager, North Central District, at 8:30 AM. This is followed by a talk on MSHA policy directions from Assistant Secretary J. Davitt McAteer at 9:00 AM. A management perspective on what it takes to build a safety culture will be provided by Kyle Dotson, Director of Occupational Health and Safety for Phelps Dodge Corp., at 9:30 AM. A labor perspective on the same topic will be offered by Dave Foster, Director, United Steelworkers of America District 33, at 10:00 AM.

Four tracks of concurrent workshops will begin at 10:30 AM. The first four workshops will conclude at 11:45 AM. Workshops will resume after the lunch break and run from 1:00-2:30 PM and from 2:30-4:00 PM.

Workshop Track 1 will address the topic of Culture Building. The 10:30 AM session, "Designing the Culture," will consist of a panel of safety directors from coal, metal, and aggregate mines describing the strategies they have used to incorporate safe work habits as essential organizational values. The 1:00 PM session, "Making the Culture Work," will feature front-line supervisors and workers discussing the practical problems that arise when past practices and beliefs clash with the vision of a safety culture.

At 2:30 PM, a panel of consultants and industry managers will offer insights into "Maintaining the Culture." Consultants Ruth Newman and Ernie Breton will demonstrate how to provide "just-in-time" training to workers when they need it the most; Jim Anderson of the Tilden Magnetite Partnership will explain proven techniques to train teams to solve problems; and Greg Oster of CAMAS America, Inc., will describe how creation of a "company university" has encouraged workers to value continuous learning.

Nuts and Bolts Safety topics will be discussed in Workshop Track 2. Tom Gregorich, Safety and Health Training Coordinator, Range Technical College, and Rob Gates, Mine Safety Inspector, Wisconsin Department of Industry, Labor and Human Relations, will analyze powered haulage hazards in the 10:30 AM session, "Mine Traffic Management." The afternoon sessions will feature Bruce Dial from the National Mine Health and Safety Academy on "Stockpiling Hazards" at 1:00 PM, and Mike Kelly from Dyno-Nobel, Inc., on "Blasting Safety" at 2:30 PM.

Health issues will be addressed in Workshop Track 3. Participating in the "Industrial Hygiene Panel" at 10:30 AM, will be George Schorr, MSHA North Central District; Phyllis Carrier, Range Technical College; and Laurie Potter, USX Corporation, Minnesota Ore Operations. At 1:00 PM, Howard Stearns of Wabash Valley College will explain "Substance Abuse" problems in the mining industry, to be followed at 2:30 PM by a presentation on "Ergonomics" from Ken Thomas, Human Factors Engineering Specialist, Wausau Insurance Companies.

Workshop Track 4 will examine Innovations in Safety and Training. At 10:30 AM, David Johnson from Power Step, Inc., will describe a technology designed to prevent slips and falls from mobile haulage equipment: the "Power Safety Step." Elaine Cullen from the U.S. Bureau of Mines will reveal methods of "Public Outreach" that have been strikingly successful in the 1:00 PM workshop, and at 2:30 PM, Dr. Michael Schaefer will present "Back Care Strategies."

Recreation will be on the agenda at 6:30 PM with a riverboat ride featuring hors d'oeuvres, a Dixieland band, a cash bar, and the scenic beauty of old St. Paul.

On Thursday, June 29, serious golfers will start their day early by boarding a bus for a golf outing at 7:30 AM. Back at the Radisson, vendors will be presenting workshops from 8:00-10:00 AM, and safety videos will be available for viewing throughout the day. At 10:30 AM, another bus will leave for a tour of the U.S. Bureau of Mines Twin Cities Research Center in Minneapolis. At 3:00 PM, members will reassemble for general meetings of JAHSA and HSA.

The evening's activities will begin with networking and socializing at 6:00 PM, followed by a banquet at 6:30 PM. Ernie Breton, inventor, scientist, iconoclast, will be the

featured speaker. Ernie has helped many organizations tap into worker creativity and intelligence to achieve amazing performance breakthroughs. He will no doubt have much to say of interest and relevance to the mining community.

Following Ernie's speech, several awards will be presented, including the HSA Man and Woman of the Year, the prestigious Ival Van Horn Award, and Medals of Honor for acts of heroism in emergency situations. In addition, the HSA will award a scholarship for the first time to a student who is enrolled, or plans to enroll, in a course of study leading to a degree in safety and health.

The JAHSA and HSA National Meeting has been developing a reputation as the premiere event of the year for people involved in mine safety and health. No other conference brings together so diverse a cross-section from all segments of the mining community. If for some reason you can only attend one off-site meeting in 1995, this is the one. Mark June 27–29 on your calendars today, and we'll see you in St. Paul!

Snoring and sleep apnea

by Douglas E. Feldman, M.D., F.A.C.S.

Legend has it that gunfighter John Wesley Harding was so mean that he shot a man to death simply for snoring. It doesn't take an angry gunfighter to make snoring dangerous.

Heavy snoring, especially when a sign of sleep apnea, is associated with higher incidences of hypertension, coronary artery disease, heart attack, and stroke, as well as depression, cognitive dysfunction, sexual dysfunction, and injury from accidents.

What causes snoring?

Snoring is a symptom of upper airway obstruction while sleeping. The sound comes from collapse of parts of the airway that lack rigid support, such as the soft palate and uvula, the back of the tongue, or the sides of the throat. Snoring by itself can lead to significant problems. It can keep sleeping partners awake, drive spouses from the bedroom and strain relationships. The snorer can be subject to ridicule, harassed by spouse and family, embarrassed in dormitories, and may suffer from morning headaches and daytime sleepiness.

At age 35, 20 percent of men and 5 percent of women snore. By the age of 60, 60 percent of men and 40 percent of women snore. The reason why more men snore than women is not known. Obesity increases the likelihood of snoring, although many people with sleep apnea are not obese. When snoring is not a sign of sleep apnea, it is not a health risk, although it obviously can have significant social impact.

There are steps one can take to reduce your likelihood of snoring. A regular exercise program can increase muscle tone and decrease obesity. One should avoid alcoholic beverages four hours before retiring, as well as avoid medications that may deepen your sleep—such as sleeping pills, tranquilizers, and sedating antihistamines. Sleeping on your side reduces snoring, while sleeping on your back may make it worse. Tilting the bed so that its head is elevated four to six inches, by placing bricks, books or blocks underneath the legs at the head of the bed, can be helpful (this can also help those with heartburn or indigestion). Kinking your neck with a pillow may increase the likelihood of snoring.

New inpatient treatment

If none of these techniques is helpful and if snoring is creating a significant problem, there is a new surgical approach that is very effective at eliminating snoring. It is called LAUP, or laser assisted uvulo palatoplasty. It is generally performed under local anesthesia in an ear, nose, and throat doctor's office.

The purpose of the procedure is to reduce the size of the soft palate and uvula, the most common source of the airway obstruction leading to snoring. The procedure is usually performed at several sittings, four to six weeks apart, until the amount of tissue removed is sufficient to eliminate or markedly diminish snoring.

The post-operative discomfort is equivalent to that of a mild sore throat and easily controlled with oral pain killers. Little or no time need be lost from work, and complications are rare. However, no surgery is risk-free, so be sure to discuss all your options with your doctor.

Sleep apnea is more serious

When the snorer's degree of airway obstruction is more severe, multiple episodes of complete cessation of breathing, or apneas, can occur. There is nothing funny about snoring when it is a sign of sleep apnea.

Apnea can result in a decrease of oxygen level in the blood, abnormal heart rhythms, and elevated blood pressure. Severe apnea can lead to intellectual deterioration with interference in memory and attention

span. Marked daytime sleepiness is common, as is falling asleep at inopportune times such as while driving. People with sleep apnea may have a seven-fold greater rate of driving accidents than those without sleep apnea. The rate of heart attack is 23 times higher in men with sleep apnea than for men without it.

In sleep apnea, spouses describe loud snoring, a struggle to breathe, interrupted by episodes of silence usually lasting more than 10 seconds, when the snorer's airway is obstructed. The silence ends with a loud snort when the snorer opens his airway and resumes breathing. The snorer is usually unaware of these episodes, but may note daytime sleepiness.

The differentiation between harmless snoring and significant sleep apnea is made on the basis of health history, physical exam, and the performance of a polysomnogram or sleep study.

The diagnosis is based on the overnight sleep study, usually performed at a hospital sleep lab, but sometimes performed in the patient's home with a portable testing unit.

If severe sleep apnea is discovered, the nightly use of continuous positive airway pressure (CPAP) delivered through a face mask is usually recommended. Surgery on the nose, palate, windpipe or jaw may also be recommended. The LAUP procedure described above may eliminate the snoring, but not the apnea, and so is not recommended for apnea patients.

If you have a significant snoring problem or are concerned about the possibility of sleep apnea, be sure to discuss it with your primary care physician or your ear, nose and throat specialist.

[Editor's note: Take it from personal experience, this is a very serious, often overlooked condition. After falling asleep twice while driving, the pinging of shoulder gravel in wheel wells was my savior, I still was not convinced. It took my wife's reading an article similar to this—my snoring was legendary—to alert me to take steps to determine that I had sleep apnea. And yes, I have to sleep with the CPAP device which is not bad when you consider the alternative.]

Everyman's disease

Nearly every man in his 80s has it. From 10% to 30% of men in their 50s have it, although most at an early stage with no symptoms. It's prostate cancer —the second leading cancer killer in men (after lung cancer). The cause is unknown; but risk increases with age and if there is a family history of the disease. It is also much more deadly in Canada, the U.S. and northern Europe than in other parts of the world; and scientists now may know why. It's our diets.

A recent study at Harvard University showed that men who ate the most fat had a 79% higher risk of developing advanced prostate cancer than those who ate the least. And those who ate the most red meat had a 164% higher risk. Fats from dairy products, fish and vegetable oils did not increase the risk, and only advanced--not all--prostate cancer was linked to fat and red meat.

If you're a male and you live long enough, you're going to develop prostate cancer. But whether it's a latent form with no symptoms or the spreading, potentially deadly variety may depend on how many fatty burgers and steaks you consume. Cut back. Besides, fat contributes to heart attacks and other things that can kill you before your prostate.

Reprinted from Ontario [Canada's] Natural Resources Safety Association's November/ December 1994 issue of ***Health & Safety RESOURCE.***

Drunk driving with a difference

According to the *Australian Safety News*, a driver in India was recently arrested for drunk driving, which is as illegal in India as it is in most of the rest of the world. The interesting feature of this story is that the vehicle he was "driving" was an elephant. The trouble began when the elephant sensed that his driver had passed out. The elephant took charge of the situation by applying the brakes and holding his keeper in place with its ears and trunk. A traffic jam ensued, attracting the attention of the authorities.

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Back to basics for backs

By Sandy Rovner

Sometimes you wake up and can barely crawl out of bed. The pain is so agonizing that just getting dressed is difficult. It is centered low in your back and it may burn its excruciating way down your leg. You'd like to go back to bed, but often that doesn't help much. There's no comfortable spot. You end up sleeping on the floor, sometimes for days on end.

Another time you'll bend down and can't get up. Or you're waiting in line at the supermarket and a back spasm nearly knocks you over.

This is what doctors call acute lower back pain.

As miserable and helpless as it makes you feel, it is rarely a truly ominous sign. You share these often recurrent bouts of agony with eight out of 10 adults, but these episodes gradually get better each time. It's what people mean when they say their back has "gone out."

Physicians confide that they dread it when a patient comes in with a "bad back." Aside from an occasional major problem—a broken bone, cancer, certain neurological disorders, for example—that can usually be diagnosed quickly, doctors rarely can pinpoint the precise cause of acute lower back pain. And nine out of 10 of these episodes get better on their own.

In a major shift, a government-sponsored medical panel (early this past December) owned up to this and recommended a startling "less is more" approach for the assessment and treatment of an acute attack of low back pain, those that last less than a month, although they may recur. If it lasts longer than three months, it is considered a chronic condition and the treatment is different.

Clinical guidelines for acute low back pain were issued last week by a group of medical specialists empaneled by the Public Health Service's Agency for Health Care Policy and Research. The panel astonished many members of the medical community as well as the public by declaring ineffective much of what had been a burgeoning armamentarium of drugs, devices, surgical procedures and other approaches, and by formally recognizing as useful the spinal manipulations performed by osteopaths, who are licensed physicians, and by chiropractors, who are not.

It recommended against surgery as a treatment for most cases of acute back pain, except in extreme circumstances established during early examinations, and against expensive imaging techniques such as X-rays, CT scans, and MRIs, in most cases.

What is more, it recommended a return to exercise, albeit somewhat limited to begin with—walking, biking, swimming—much sooner than had been commonly practiced, and it called for much less bed rest. Even while pain is still present, the panel concluded, some exercise is beneficial. Bed rest often inhibits recovery by immobilizing and weakening muscle and bone, the panel said.

In its review of nearly 4,000 published, peer-reviewed clinical trials, the panel found that simple analgesics—aspirin, acetaminophen or non-prescription nonsteroidal antinflammatory drugs such as ibuprofen—were essentially as good in relieving pain as more expensive and more disabling narcotics.

In the past, patients whose back pain was especially bad might be hospitalized and rigged up in traction contraptions to help relieve pain. They sometimes were given liberal doses of muscle relaxants, many of which also serve as tranquilizers and sedatives. The panel's guidelines suggest that this treatment is no more effective than treating the back at home. Also rejected by the panel were other antidepressants and oral steroids. These powerful drugs often had major side effects, ranging from bone marrow suppression to gastrointestinal irritation and mood disturbances.

The panel also discarded a heat treatment called diathermy, massage, ultrasound, cutaneous laser treatment and TENS—electrical stimulation machines. Instead, the panel recommended such simple treatments as ice packs or heating pads, along with the milder analgesic drugs.

It did not find that techniques such as acupuncture or biofeedback had been shoves by clinical trials to be useful for acute attacks. But Stanley J. Bigos, chairman of the panel and professor of orthopedic surgery and environmental health at the University of Washington School of Medicine in Seattle, acknowledged that these approaches were more often used in chronic cases. He noted that "just because a technique or treatment is not proved to be efficacious doesn't mean that no further investigation should be made."

Bigos said physician efforts to alleviate the fears of patients accounted for the increased use of expensive imaging techniques, unnecessary surgery and an assortment of unproven approaches. In an effort to help patients understand the attacks and perhaps prevent recurrences, the panel issued these recommendations to guide people before pain strikes:

- Wear comfortable shoes with low heels.
- Use a chair with good lower back support and rest feet on a low stool.
- If you work standing up, try resting one foot on a low stool.
- Tuck a small pillow or rolled-up towel behind the small of your back when driving long distances.
- If you sleep on your back, keep a pillow under your knees or between them if you sleep on your side.

THE LAST WORD...

Never insult an alligator until you've crossed the river. —Cordell Hull

Even the best things are not equal to their fame. — Henry David Thoreau

The lust of fame is the last that a wise man shakes off. — Tacitus

Fame is a fickle food upon a shifting plate. — Emily Dickinson

The fame of great men ought to be judged always by the means they used to acquire it. — François de La Rochefoucauld

It often happens that those of whom we speak least on earth are best known in heaven. — Nicolas Caussin

Fame is vapor, popularity an accident, riches take wings. Only one thing endures and that is character. — Horace Greeley

The highest form of vanity is love of fame. — George Santayana

Fame usually comes to those who are thinking about something else. — Oliver Wendell Holmes

Fame is proof that people are gullible. — Ralph Waldo Emerson

If fame is only to come after death, I am in no hurry for it. — Martial

If you lose the power to laugh, you lose the power to think. —Clarence Darrow

NOTICE: We welcome any materials that you submit to the Holmes Safety Association Bulletin. We *desperately* need vertical format color photos for our cover. We cannot guarantee that they will be published, but if they are, we will list the contributor(s). Please let us know what you would like to see more of, or less of, in the Bulletin.

REMINDER: The District Council Safety Competition for 1995 is underway—please remember that if you are participating this year, you need to mail your quarterly report to:

Mine Safety & Health Administration
Educational Policy and Development
Holmes Safety Association Bulletin
P.O. Box 4187
Falls Church, Virginia 22044-0187

Phone: (703) 235-1400

Joseph A. Holmes Safety Association Awards Criteria

Type "A" Award – For Acts of Heroism

The award is a medal with a Medal of Honor Certificate.

Type "A" Award – For Acts of Heroic Assistance

The award is a Certificate of Honor.

Type B-l Award – For Individual Workers

(40 years continuous work experience without injury that resulted in lost workdays)

The award is a Certificate of Honor, a Gold Pin, and a Gold Decal.

Type B-2 Award – For Individual Officials

(For record of the group working under their supervision)

The award is a Certificate of Honor.

Type C Award – For Safety Records

(For all segments of the mineral extractive industries meeting adopted criteria)

The award is a Certificate of Honor.

Other Awards – For Individual Workers

(For 10, 20, or 30 years without injury resulting in lost workdays)

The awards are 30 years–Silver Pin and Decal, 20 years–Bronze Pin and Decal, 10 years–Decal bearing insignia.

Special Award – For Small Operators

(Mine operators with 25 employees or less with outstanding safety records)

The award is a Certificate of Honor.

For information contact: Secretary-Treasurer
Joseph A. Holmes Safety Association (703) 235-8264

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